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REDDENING AND EXTINCTION TOWARDS HII REGIONS: A PROGRESS REPORT \*

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The light emitted by the gas in HII regions is attenuated by dust. This extinction can be measured by comparing  $H\alpha$ ,  $H\beta$ , and radio continuum fluxes, since the intrinsic ratios of the Balmer line and thermal radio continuum emissivities are nearly constant for reasonable conditions in HII regions. In the case of giant extragalactic HII regions (c.f. Israel and Kennicutt, 1980), the extinction (from the  $H\beta$ /radio ratio) has generally been found to be considerably greater than that expected, on the basis of a "standard" law, for the reddening (from the  $H\alpha$ / $H\beta$  ratio). More recent work (Caplan and Deharveng, 1986, and van der Hulst, Kennicutt, Crane, and Rots, 1988), although confirming this phenomenon, shows that the discrepancy is less than previously believed.

The extinction excess can be explained in several ways. The dust between us and the emitting gas may have an optical thickness which varies from one point to another over the solid angle subtended by the HII region. The dust may be close enough to the source that scattered light contributes to the flux, or the dust may actually be mixed with the emitting gas. It is difficult to decide which configuration - or combination of configurations - is correct.

The poster presents a rediscussion of the question in the light of our recent observations, with our Fabry-Perot spectrophotometer, of large Galactic HII regions (smaller however than giant extragalactic regions). As these objects are all near the plane of the Galaxy, a large part of the extinction is certainly caused by "interstellar" (i.e. foreground) dust. These regions exhibit definite extinction excesses, which however are rather small with the exception of that of IC 1795, for which a molecular cloud almost totally blocks the light of part of the nebula.

It is instructive to compare the color excesses for stars embedded in these HII regions with those derived (assuming the standard law) from the nebular extinction and reddening. The average value found for stars should indicate the optical depth to the center of the HII region. We find that  $E_{B-V}$  (average for stars)  $>$   $E_{B-V}$  (from  $H\beta$ /radio)  $>$   $E_{B-V}$  (from  $H\alpha$ / $H\beta$ ). This result is consistent with various dust distributions, and in particular with internal dust. However, if really large amounts of

dust were located inside the regions, we would expect even greater stellar reddening. In the LMC, we had found  $E_{B-V}$  (average for stars) to be about equal to  $E_{B-V}$  (from  $H\alpha/H\beta$ ), but this is clearly due to selection effects: those stars truly inside the HII regions are not observed. Some selection may be present for our Galactic regions too, certain stars being hidden behind opaque clouds.

#### References

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van der Hulst, J.M., Kennicutt, R.C., Crane, P.C., and Rots, A.H.: 1988, *Astron. Astrophys.* 195, 38.

\* The observations were made at the Observatoire de Haute Provence.